

WHAT IS CLAIMED IS:

1. A method, comprising:
accessing a first lookup table based on a first portion of a packet header,
wherein
the first portion of the packet header comprises at least part of a
multicast destination address, and
the first lookup table identifies a portion of a second lookup table, the
portion of the second lookup table comprising at least one
entry; and
accessing the portion of the second lookup table based on a second portion of
the packet header.
2. The method of claim 1, wherein
the second lookup table identifies at least one output interface via which a
packet comprising the packet header should be output.
3. The method of claim 2, wherein
the portion of the second lookup table corresponds to one of a plurality of
scopes.
4. The method of claim 3, wherein
the portion of the second lookup table corresponds to a link-local scope of the
scopes if a scope of the multicast destination address is link-local;
the portion of the second lookup table corresponds to a site-local scope of the
scopes if the scope of the multicast destination address is site-local;
and
the portion of the second lookup table corresponds to a global scope of the
scopes if the scope of the multicast destination address is global.
5. The method of claim 4, wherein
if a scope of the source address comprised in the packet header is less than the
scope of the multicast destination address, each entry comprised in the

portion of the second lookup table identifies only output interfaces associated with one of a plurality of zones, and
a scope of the one of the zones is equal to the scope of the source address.

6. The method of claim 2, wherein
the packet header comprises a source address,
the portion of the second lookup table corresponds to a shortest-path multicast tree if a match for the source address is found in the first lookup table,
and
the portion of the second lookup table corresponds to a shared multicast tree if no match for the source address is found in the first lookup table.

7. The method of claim 2, wherein
the accessing the portion of the second lookup table comprises providing a key to the second lookup table, wherein
the key comprises an ID of a RPF (Reverse Path Forwarding) interface,
and
the RPF interface received a packet in which the packet header was comprised.

8. The method of claim 2, further comprising:
the first lookup table indicating at least one of an access control rule and a quality of service level in response to receiving a key associated with a packet.

9. The method of claim 8, further comprising:
the second lookup table indicating a state of a network flow in response to receiving a key associated with a packet.

10. The method of claim 8, further comprising:
accessing a third lookup table to forward a packet addressed to an IPv6 (Internet Protocol version 6) unicast destination address, wherein

a width of each entry in the third lookup table is less than a width of a key comprising both an IPv6 destination address and an IPv6 source address.

11. The method of claim 2, wherein the first lookup table identifies the portion of the second lookup table by identifying a mask, wherein a key generated using the mask only matches entries comprised in the portion of the second lookup table.

12. The method of claim 11, further comprising:
applying the mask to the multicast destination address and an interface ID, wherein
the interface ID identifies an input interface that received a packet comprising the packet header.

13. The method of claim 12, wherein
the packet header comprises a source address;
the mask selects a portion of the source address identifying a scope of the source address if the source address has a non-global scope;
the mask does not select any of the source address if the source address has a global scope.

14. The method of claim 12, wherein
the mask selects all of the source address if the accessing the first lookup table comprised matching an entry, which corresponds to a shortest-path multicast tree, in the first lookup table.

15. The method of claim 11, further comprising
applying the mask to the second portion of the packet header to produce a masked second portion; and
generating a hash based on the masked second portion, wherein
the accessing the second lookup table dependent on the second portion of the packet header comprises:

providing a key comprising the hash to the second lookup table.

16. The method of claim 2, further comprising:

allocating a single entry in the first lookup table for each shortest-path multicast tree.

17. The method of claim 16, further comprising:

for each shared multicast tree, allocating a first entry and a second entry in the first lookup table, wherein
the first entry matches a source address having a global scope, and
the second entry matches a source address having a non-global scope.

18. The method of claim 17, further comprising:

allocating a plurality of entries in the second lookup table for each shared multicast tree, wherein
each of the entries corresponds to a respective one of a plurality of scopes, and
each of the entries only identifies output interfaces included in a zone of the respective one of the plurality of scopes.

19. A system comprising:

a first lookup table comprising a plurality of first lookup table entries;
a second lookup table comprising a plurality of second lookup table entries;
and
a lookup restriction unit, wherein
the first lookup table is configured to identify first information in response to receiving a first key generated from a first portion of a packet header, the first portion of the packet header comprising a multicast destination address, the first information identifying a portion of the second lookup table, the portion comprising at least one of the second lookup table entries; and
the lookup restriction unit is configured to prevent a second key generated from a second portion of the packet header from

matching any second lookup table entry that is not comprised in the portion of the second lookup table identified by the first information.

20. The system of claim 19, wherein the second lookup table is configured to identify second information in response to receiving the second key, the second information identifying at least one output interface via which a packet comprising the packet header should be output.

21. The system of claim 20, wherein the portion of the second lookup table corresponds to one of a plurality of scopes.

22. The system of claim 21, wherein the portion of the second lookup table corresponds to a link-local scope of the scopes if a scope of the multicast destination address is link-local; the portion of the second lookup table corresponds to a site-local scope of the scopes if the scope of the multicast destination address is site-local; and the portion of the second lookup table corresponds to a global scope of the scopes if the scope of the multicast destination address is global.

23. The system of claim 22, wherein if a scope of the source address comprised in the packet header is less than the scope of the multicast destination address, each second lookup table entry comprised in the portion of the second lookup table identifies only output interfaces associated with one of a plurality of zones, and a scope of the one of the zones is equal to the scope of the source address.

24. The system of claim 20, wherein the portion of the second lookup table corresponds to a shortest-path multicast tree if a match for the source address is found in the first lookup table; and

the portion of the second lookup table corresponds to a shared multicast tree if no match for the source address is found in the first lookup table.

25. The system of claim 20, wherein the second key comprises an ID of a RPF (Reverse Path Forwarding) interface, and the RPF interface received a packet in which the packet header was comprised.

26. The system of claim 20, wherein the first information comprises a mask, wherein a key generated using the mask only matches second lookup table entries comprised in the portion of the second lookup table.

27. The system of claim 26, wherein the mask is applied to a source address, the multicast destination address, and an interface ID to generate the second key, the source address is comprised in the packet header, and the interface ID identifies an input interface that received a packet comprising the packet header.

28. The system of claim 27, wherein the mask selects a portion of the source address identifying a scope of the source address if the source address has a non-global scope; the mask does not select any of the source address if the source address has a global scope.

29. The system of claim 28, wherein the mask selects all of the source address if the accessing the first lookup table comprised matching an entry, which corresponds to a shortest-path multicast tree, in the first lookup table.

30. The system of claim 26, wherein

the mask is applied to the second portion of the packet header to produce a masked second portion,
a hash is generated based on the masked second portion, and
the second key comprises the hash.

31. The system of claim 20, wherein
the first lookup table comprises one first lookup table entry for each shortest-path multicast tree.

32. The system of claim 31, wherein
the first lookup table comprises a first entry and a second entry for each shared multicast tree,
the first entry matches a source address having a global scope, and
the second entry matches a source address having a non-global scope.

33. The system of claim 32, wherein
the second lookup table comprises a plurality of entries for each shared multicast tree,
each of the entries corresponds to a respective one of a plurality of scopes, and
each of the entries only identifies output interfaces included in a zone of the respective one of the plurality of scopes.

34. A computer readable medium, comprising program instructions executable to:
allocate at least one entry in a first lookup table and at least one first entry in a portion of a second lookup table for each multicast tree, the portion of the second lookup table comprising at least one entry; and
configure a lookup restriction unit to prevent a lookup in the second lookup table from matching entries not included in the portion of the second lookup table if a corresponding lookup in the first lookup table matches the at least one entry in the first lookup table.

35. The computer readable medium of claim 34, wherein the program instructions are further executable to:
allocate a single entry in the first lookup table for each shortest-path multicast tree.

36. The computer readable medium of claim 34, wherein the program instructions are further executable to:
allocate a first entry and a second entry in the first lookup table for each shared multicast tree, wherein
the first entry matches a source address having a global scope, and
the second entry matches a source address having a non-global scope.

37. The computer readable medium of claim 36, wherein the program instructions are further executable to:
allocate a plurality of entries in the second lookup table for each shared multicast tree, wherein
each of the entries corresponds to a respective one of a plurality of scopes, and
each of the entries only identifies output interfaces included in a zone of the respective one of the plurality of scopes.

38. The computer readable medium of claim 34, wherein the program instructions are further executable to:
configure the lookup restriction unit by storing a mask in a mask table,
wherein a key generated using the mask will only match entries comprised in the portion of the second lookup table.

39. The computer readable medium of claim 34, wherein the program instructions are further executable to:
access a first lookup table based on a first portion of a packet header, wherein
the first lookup table identifies the portion of a second lookup table;
and

access the portion of the second lookup table based on a second portion of the packet header.

40. The computer readable medium of claim 39, wherein the program instructions are further executable to:

provide a key to the second lookup table, wherein
the key is generated based on an ID of a RPF (Reverse Path Forwarding) interface, and
the RPF interface received a packet in which the packet header was comprised.

41. A system comprising:

means for accessing a first lookup table based on a first portion of a packet header, wherein
the first portion of the packet header comprises a multicast destination address, and
the first lookup table identifies a portion of a second lookup table, the portion of the second lookup table comprising at least one entry; and
means for accessing the portion of the second lookup table based on a second portion of the packet header.

42. The system of claim 41, wherein
the second lookup table identifies at least one output interface via which a packet comprising the packet header should be output.

43. The system of claim 42, wherein
the portion of the second lookup table corresponds to one of a plurality of scopes.

44. The system of claim 43, wherein
the portion of the second lookup table corresponds to a link-local scope of the scopes if a scope of the multicast destination address is link-local;

the portion of the second lookup table corresponds to a site-local scope of the scopes if the scope of the multicast destination address is site-local;
and

the portion of the second lookup table corresponds to a global scope of the scopes if the scope of the multicast destination address is global.

45. The system of claim 44, wherein
if a scope of the source address comprised in the packet header is less than the scope of the multicast destination address, each entry comprised in the portion of the second lookup table identifies only output interfaces associated with one of a plurality of zones, and
a scope of the one of the zones is equal to the scope of the source address.

46. The system of claim 42, wherein
the portion of the second lookup table corresponds to a shortest-path multicast tree if a match for the source address is found in the first lookup table;
and
the portion of the second lookup table corresponds to a shared multicast tree if no match for the source address is found in the first lookup table.

47. The system of claim 42, wherein
the means for accessing the portion of the second lookup table provide a key to the second lookup table, wherein
the key comprises an ID of a RPF (Reverse Path Forwarding) interface,
and
the RPF interface received a packet in which the packet header was comprised.

48. The system of claim 42, wherein the first lookup table identifies the portion of the second lookup table by identifying a mask, wherein
a key generated using the mask only matches entries comprised in the portion of the second lookup table.

49. The system of claim 48, further comprising:
means for applying the mask to a multicast destination address and an
interface ID, wherein
the multicast destination address is comprised in the packet header, and
the interface ID identifies an input interface that received a packet
comprising the packet header.
50. The system of claim 49, wherein
the packet header comprises a source address;
the mask selects a portion of the source address identifying a scope of the
source address if the source address has a non-global scope;
the mask does not select any of the source address if the source address has a
global scope.
51. The system of claim 50, wherein
the mask selects all of the source address if the accessing the first lookup table
comprised matching an entry, which corresponds to a shortest-path
multicast tree, in the first lookup table.
52. The system of claim 42, further comprising
means for applying the mask to the second portion of the packet header to
produce a masked second portion; and
means for generating a hash based on the masked second portion, wherein
accessing the second lookup table dependent on the second portion of
the packet header comprises:
providing a key comprising the hash to the second lookup table.
53. The system of claim 42, further comprising:
means for allocating a single entry in the first lookup table for each shortest-
path multicast tree.
54. The system of claim 53, further comprising:

means for allocating a first entry and a second entry in the first lookup table
for each shared multicast tree, wherein
the first entry matches a source address having a global scope, and
the second entry matches a source address having a non-global scope.

55. The system of claim 54, further comprising:

means for allocating a plurality of entries in the second lookup table for each
shared multicast tree, wherein
each of the entries corresponds to a respective one of a plurality of
scopes, and
each of the entries only identifies output interfaces included in a zone
of the respective one of the plurality of scopes.